

Patent Claims:

1. An apparatus for performing scattered radiation measurements in fluids, comprising a sender (1), for example a light source to directly emit radiation into the fluid (5), a detector (2) to measure scattered radiation in the fluid, at least one separator (4) that is located between the fluid and the sender/detector and that allows the radiation to pass through it, wherein, at least one optical deflection element (8, 9) is provided between the sender and the separator and/or between the detector and the separator, in order to deflect the emitted beam/the scattered beam toward the perpendicular onto the separator.

2. The apparatus of Claim 1, wherein, a first deflection element (8) is provided between the sender and the separator, and a second deflection element (9) is provided between the separator and the detector.

3. The apparatus of one of the above claims, wherein, the deflection element (8, 9) is comprised of a reflecting prism.

4. The apparatus of Claims 3, wherein, the reflecting prism (8, 9) has a radiation entry/exit surface (10) which is configured as a nonplanar aspherical surface in the deflection element.

5. The apparatus of one of the above claims, wherein, the optical deflection element (8, 9) has an entry surface/exit surface (10) that is disposed in such a way that the center beam enters/exits perpendicularly, and a deflection surface that is disposed in such a way that the center beam is reflected in the interior of the deflection element.

6. The apparatus of Claim 5, wherein the entry surface/exit surface (10) is curved in such a way that the beams emitted by the sender or leaving the deflection element travel in the deflection element parallel to the optical axis of the surface.

7. The apparatus of Claim 5 or 6, wherein total reflection is achieved at the deflection surface by properly selecting the angle of incidence (α) and the material.

09811059-071601

8. The apparatus of Claim 5, 6 or 7, wherein the entry surface/exit surface (10) is a spherical surface.

9. The apparatus of one of the above claims, wherein the deflection element (8, 9) is provided to achieve parallel alignment and deflection of the emitted beam/incident scattered beam.

10. The apparatus of one of the above claims, wherein the surfaces of the optical deflection elements are comprised of a circular cylindrical or spherical surface and of flat surfaces.

11. The apparatus of one of the above claims, wherein the optical deflection element (8, 9) is disposed directly on the separator (10).

12. The apparatus of one of the above claims, wherein the optical deflection elements and the separator are configured as units that are connect to one another or comprise an integral part.

13. The apparatus of one of the above claims, wherein the sender (1) and detector (2) are not disposed in the same plane as the optical deflection elements (8) and (9) (Figure 4).

14. The apparatus of one of the above claims, wherein the sender (1), receiver (2) and the optical components (8, 9) lie in the same plane, and the light paths cross (Figure 5).

TOP SECRET 071601